American Psychological Association

Experimental and Clinical Psychopharmacology

1064-1297/19/$12.00

2019, Vol. 27, No. 2, 160–165
http://dx.doi.org/10.1037/pha0000236

Young Adults Do Not Catch Up Missed Drinks When Starting Later at Night—An Ecological Momentary Assessment Study

Martine Groefsema and Maartje Luijten
Radboud University

Rutger Engels
Erasmus University Rotterdam

Emmanuel Kuntsche
Radboud University and La Trobe University

Drinking heavily in a short period is associated with significant health risks. However, little is known about when heavy drinking occurs during an evening. Recently, research found that individuals increase their drinking pace across the evening, speeding up their drinking. The current study examines whether this speeding up is different depending on when individuals start to drink in the evening. Data on alcohol consumption were collected among 197 young adults in the Netherlands (48.7% female, M_{age} = 20.8 SD = 1.7) on Thursday, Friday and Saturday evenings for 5 consecutive weeks using questionnaires send to participants' smartphone every hour between 9 p.m.–1 a.m. The final sample consisted of 10,144 questionnaires across 2,781 evenings. On evenings when individuals started to drink early (between 8 and 9 p.m.), more alcohol was consumed in the first drinking hour, yet no increase in acceleration was found compared to evenings when individuals started later. Moreover, starting later resulted in a lower overall evening consumption and less binge-drinking episodes compared to starting earlier. The results indicate that when individuals start drinking later in the evening they do not tend to catch up the "missed" drinks, that is they do not increase their drinking faster when starting later in the evening, and they drink less heavily. Therefore, motivating young adults to postpone their first drink in the evening could help heavy drinking young adults to drink less on weekend evenings.

Public Health Significance
This study showed that when individuals start to drink later in the evening, they do not speed up faster in drinking and also drink less across the entire evening. Motivating to postpone drinking might therefore result in less heavy drinking on weekend evenings in young adults.

Keywords: alcohol use, young adults, event-level, binge drinking

Supplemental materials: http://dx.doi.org/10.1037/pha0000236.supp

Heavy drinking is widespread among young adults and occurs primarily on weekend nights when individuals have fewer responsibilities the next day (Hoeppner et al., 2012; Kuntsche & Labhart, 2012). Drinking heavily in a short period of time, or "binge drinking," is related to a variety of harmful consequences, such as accidents and aggressive episodes (Graham & Wells, 2003; Harford, Wechsler, & Muthén, 2003; Kuntsche, Kuntsche, Thrul, & Gmel, 2017). While much research has focused on the contexts in which drinking takes place (Cullum, O'Grady, Armeli, & Tennen, 2012; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007), little is known about when heavy drinking occurs across a given evening. One example of heavy drinking being tied to timing is predrinking, a specific type of binge drinking that occurs just before going out, which can lead to alcohol-related negative consequences as individuals drink large quantities of alcohol in a short period (Foster & Ferguson, 2014; Kuntsche & Labhart, 2013a; Labhart, Ferris, Winstock, & Kuntsche, 2017). From a public health perspective, more detailed information on multiple patterns of risky drinking during a given episode may open up new opportunities for prevention campaigns that target risky drinking.

This article was published Online First November 1, 2018.

Martine Groefsema and Maartje Luijten, Department of Developmental Psychopathology, Behavioural Science Institute, Radboud University; Rutger Engels, Department of Social Sciences, Erasmus University Rotterdam; Emmanuel Kuntsche, Behavioural Science Institute, Radboud University, and Centre for Alcohol Policy Research, School of Psychology and Public Health, La Trobe University.

All authors have contributed equally to the manuscript and have read and approved the final manuscript. All authors have no conflicts of interest to declare. This study was funded by the Behavioural Science Institute. The funding source had no other role other than financial support.

Correspondence concerning this article should be addressed to Martine Groefsema, Department of Developmental Psychopathology, Behavioural Science Institute, Radboud University, P.O. Box 9104, 5550 HE Nijmegen, the Netherlands. E-mail: m.groefsema@bsi.ru.nl

Due to technological limitations, most information on alcohol use to date has been collected retrospectively, that is, outside of the actual drinking situation. Recent event-level studies measuring drinking patterns across the entire evening (Kuntsche & Labhart, 2013b, 2013c) revealed that young adults consumed an increasing number of drinks per hour on Saturday evenings (Kuntsche & Labhart, 2012; Kuntsche, Otten, & Labhart, 2015), with the rate of consumption increasing at the beginning of the evening before stabilizing thereafter. Drinking fast is a risky drinking pattern as the faster you drink, the higher your blood-alcohol level becomes, which increases the risk of negative consequences (Higgs, Stafford, Attwood, Walker, & Terry, 2008; Leeman et al., 2010).

In this study, we aim to further explore these drinking patterns by testing whether drinking patterns are influenced by the timing of drinking onset. A later onset of drinking on an evening usually leaves fewer hours to consume alcohol, and may, therefore, lower the chance of getting intoxicated. Yet, when individuals try to catch up their missed drinks by drinking faster to achieve a preferred level of intoxication, risks related to binge drinking arise. This study may show that the timing of the first alcoholic drink on an evening is related to the speed and amount of alcohol consumed.

We aim to investigate whether drinking patterns vary as a function of the moment in the evening when drinking begins, by testing (1a) the drinking quantities in the first drinking hour of evening consumption (i.e., intercept) and (1b) the drinking pace acceleration in the subsequent hours (i.e., slope) for individuals who start drinking at different time points. Subsequently, we investigate whether consumed quantities depend on the moment in the evening when drinking begins, by testing (2a) differences in the total amount of alcohol consumed during the entire evening, and (2b) differences in the number of binge-drinking evenings. We hypothesize that starting to drink later in the evening results in either a higher drinking pace in the first hour and a steeper slope over the following drinking hours, if individuals try to catch up "missed" drinks, or in a lower drinking pace and a gradual slope, if individuals do not try to catch up.

Materials and Method

Study Design

Participants were recruited through (online) advertisements. Inclusion criteria were (a) being in the 18–25 age bracket; (b) using alcohol at least weekly; and (c) owning a smartphone with 3G Internet access. A baseline assessment was scheduled in a laboratory at Radboud University; participants completed an online questionnaire and received instructions on the Ecological Momentary Assessment (EMA) procedures (Groefsema, Engels, Kuntsche, Smit, & Luijten, 2016). The EMA data collection started on the Thursday following the baseline assessment. Six e-mails, with alerts, were sent to participants' smartphones (at 9 p.m., 10 p.m., 11 p.m., midnight, 1 a.m., and the next morning at 11 a.m.) every Thursday, Friday, and Saturday for 5 consecutive weeks (Kuntsche & Labhart, 2013b, 2013c). Each message contained a link to a short online questionnaire. First, participants were given information on the specific time period to which the questions related (60 min; for example, from 8 p.m. to 9 p.m. for the questionnaire sent at 9 p.m.), followed by four short questions assessing the participants' alcohol use and environmental factors (see Figure 1). The morning assessment included the same questions on alcohol use for the time period after 1 a.m., as well as a question assessing the participants' bedtime. Participants were asked to complete the questionnaire as soon as possible after receiving the e-mail. Participants who successfully completed the baseline assessment and at least 66% of the EMA questionnaires received €50 ($53) as an incentive. The Ethics Committee of the Faculty of Social Sciences at Radboud University (ECG2013-1308–117) approved the study, and all participants gave their informed consent. Data collection was conducted between September 2013 and January 2014. On the same dataset, two earlier studies have been published, looking at the moderating effect of drinking motives in social drinking situations (Smit, Groefsema, Luijten, Engels, & Kuntsche, 2015) and the relation between cognitive biases and drinking in social settings (Groefsema et al., 2016). Both studies did not look into the change in drinking patterns over the course of the evening, so all analyses reported in this paper are unique and not included in the earlier studies.

Figure 1. Prototype of the Ecological Momentary Assessment (EMA) questionnaire sent to participants' mobile phones.

Sample and Data Selection

From the total number of questionnaires sent (N = 18,180), only the evening assessments (i.e., not the morning assessment) were included (N = 15,150). Data pertaining to five participants (2.5%)

were excluded as they had completed less than one third of all questionnaires ($n = 81$, 0.4%). To ensure reliable data, incomplete questionnaires ($n = 2{,}267$, 12.5%) and questionnaires that were completed more than 1 hour after distribution ($n = 2{,}658$, 14.6%) were excluded from the analyses. The median response time was 6.7 min ($SD = 13.1$). The mean completed questionnaires per individual were 51 out of 75 ($SD = 11$), and the dataset contained 848 evenings on which all questionnaires were completed by an individual. The final sample consisted of 197 participants (96 women, 48.7%, $M_{age} = 20.8$, $SD = 1.7$), and 10,144 assessments over 2,781 evenings (see online supplementary Figure 1).

Measures

In the baseline questionnaire, participants were asked to indicate their gender, complete the Alcohol Use Disorder Identification Test (AUDIT) questionnaire (Saunders, Aasland, Babor, de La Fuente, & Grant, 1993), and to report on their alcohol use during an average week by indicating the number of drinks consumed on each day. In the EMA questionnaires, alcohol use was measured separately for each beverage type ("beer", "wine", and "strong liquor") by means of the following question: "Between . . . pm and . . . pm, how many of the following drinks have you had?' Answer categories ranged from *0* to *5 or more* (coded as 5.5). The categorization of beverages and the limited choice of six response options was chosen to minimize the response burden for the participants and ensured that the entire questionnaire could be displayed on one screen, regardless of the type of mobile device used (see Figure 1). The number of alcoholic drinks (i.e., beer, wine, liquor) per timeframe were added to compute a total alcohol consumption score for a given hour.

Statistical Analyses

To examine whether drinking patterns vary as a function of the moment in the evening when drinking begins, latent growth curve models were performed in Mplus software (Muthén & Muthén, 1998–2012). In order to examine the drinking pace in the first hour of drinking, the original dataset was restructured so that the first hour of alcohol consumption on a given evening reflects the first assessment. Since we measured alcohol use until 1 a.m., there was "missing data" for the individuals who started drinking after 9 p.m., as starting to drink later consequently resulted in less drinking hours to measure (see Figure 2b). Since three data points are needed to calculate a growth curve, we did not include evenings on which individuals started after 11 p.m. in the analyses. The latent growth curve model estimated an intercept (i.e., the number of alcoholic drinks in the first hour), and a slope (i.e., the increase/decrease over the following hourly assessments). Subsequently, differences in the amount consumed in the first hour and increase/decrease over the subsequent hours between the evenings on which individuals started at different time points were estimated by regressing the intercept and slope on two dummy variables, representing the starting times (see online supplemental material for the exact Mplus syntax). For assessing the model fit, we used the CFI (Comparative Fit Index), the TLI (Trucker Lewis Index) and the RMSEA (Root Mean Square Error of Approximation). The CFI and TLI compare the tested model with a null or independent model; recommended thresholds for a good model fit is a CFI and a TLI ≥ 0.95. The RMSEA represents the mean deviation of the data from the model per degree of freedom. A RMSEA <0.1 is desirable (Kline, 2005).

In addition to the drinking patterns, the difference in the amount of alcohol consumed across the entire evening was examined depending on starting time. For the total amount of alcohol consumed in a given evening, a sum score across all the five timeframes was calculated and entered as the dependent variable in a one-way ANOVAs in SPSS, with the starting time as a between-subjects factor. For the binge drinking, all evenings were categorized as either a binge-drinking evening or not. This was done by calculating whether the cut-off of four alcoholic drinks for females and five alcoholic drinks for males was reached in 2 subsequent drinking hours anytime across the evening (Wechsler, Dowdall, Davenport, & Castillo, 1995). The differences between the evenings on which individuals started at a certain time in the number of binge-drinking evenings were examined using a chi-square test.

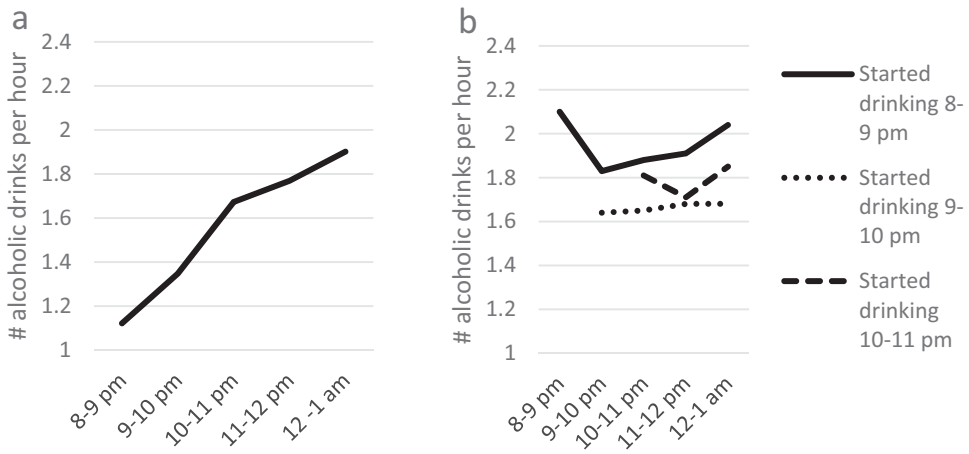

Figure 2. Drinking trajectories (a) over the course of the evening among drinkers, (b) drinking trajectories separate for starting time.

Results

Descriptives

The sample consisted of relatively heavy drinking individuals with a mean score of 12.79 ($SD = 5.57$) on the AUDIT and a mean consumption of 16.79 ($SD = 13.10$) alcoholic drinks per week. For both men and women, the percentage of drinkers increased over the course of the evening (see Table 1), with means of 65.0% for men and 46.6% for women across the total evening. Additionally, over the course of the evening, the number of alcoholic drinks consumed per hour increased (see Figure 2a). The mean consumption on drinking evenings was 4.57 ($SD = 5.95$, median = 2) for men, and 2.07 ($SD = 3.48$, median = 0) for women, which was significantly different, $t(2779) = -13.452$, $p < .001$.

Drinking Patterns Over the Course of the Evening Depending on Starting Time

The latent growth model revealed that participants who started between 9 and 10 p.m. had a lower intercept; that is, they drank less in the first hour when starting drinking (see Table 2). No differences were found on the slope suggesting that early or late starting did not affect the drinking pace in the subsequent hours. Gender effects were found on both the intercept as the slope showing that men consumed more drinks in their first drinking hour and showed a steeper acceleration in drinking pace over subsequent hours compared to women.

Drinking Quantity

Total amounts of alcohol consumed across the entire evening differed significantly between the evenings on which individuals started to drink at 8 p.m., 9 p.m., or 10 p.m. ($F_{(2,1399)} = 49.693$, $p < .001$). Post hoc tests revealed that the significant difference was driven by the large quantity consumed on evenings on which individuals that started to drink at 8 p.m. ($M = 7.72$, $SD = 6.40$), relative to the evenings on which individuals started an hour later at 9 p.m. ($M = 5.30$, $SD = 4.54$), or at 10 p.m. ($M = 4.36$, $SD = 3.56$). Thus, when individuals started to drink earlier, more alcohol was consumed in total over the course of the evening.

The number of binge-drinking evenings also differed between the evenings on which individuals started to drink at 8 p.m., 9 p.m., or 10 p.m. ($F_{(2,1399)} = 10.870$, $p < .001$). Post hoc tests revealed that this difference was again driven by the high percentage of binge drinking on evenings on which individuals started to drink at 8 p.m. (46.8%), relative to the evenings on which individuals started at 9 p.m. (36.6%), or 10 p.m. (32.6%).

Discussion

Our results show that, especially on evenings on which individuals start to drink early (e.g., between 8 and 9 p.m.) or late (e.g., between 10 and 11 p.m.), high numbers of alcoholic drinks are consumed in the first drinking hour. Surprisingly, individuals who start to drink between 9 and 10 p.m. showed lower starting paces, possibly because they different intentions for the evening, as the early starters might predrink and the late starters might join their drinking friends after finishing other obligations. Yet, these explanations are not tested and drinking intentions should be included in future research.

In addition, no differences in drinking pace (i.e., slope) were found across the subsequent hours between evenings on which individuals started at different times; individuals do not catch up missed drinks. Moreover, when individuals start drinking later, they consume less alcohol in total during the evening and showed less binge drinking. Based on these results, it may be promising to motivate individuals to postpone the first drink as drinking to catch up (i.e., increased drinking pace when starting to drink later) is not a common drinking pattern and starting to drink later might result in the consumption of less alcohol consumed and less binge drinking.

The current ecological momentary assessment study adds to the literature by showing that young adults do not catch up "missed" drinks when they start drinking later in the evening. Therefore, it seems likely that the increase in drinking pace that has been found previously (Kuntsche & Labhart, 2012; Kuntsche et al., 2015), is either an individual or an evening-specific drinking pattern rather than a consequence of the moment when one starts drinking on a given evening. Specific social-environmental factors where alcoholic drinks are often consumed, such as a dinner, a birthday party, or night in a club, likely have a larger influence on the drinking pace than the time that has elapsed time since the onset of drinking. Future research should examine whether speeding up drinking during the evening is related to factors that have previously been linked to heavy drinking, such as social company (Thrul & Kuntsche, 2016), predrinking (Labhart, Graham, Wells, & Kuntsche, 2013) or time spent in a bar (Labhart, Wells, Graham, & Kuntsche, 2014), or whether typical (homogeneous) groups of individuals can be defined, who start at certain times in the evening and have

Table 1
Percentage of Drinkers per Hour and Average Consumed Quantities Among Drinkers, Separately for Gender

Descriptives	8–9 pm	9–10 pm	10–11 pm	11 pm–midnight	Midnight–1 am
Men					
Percentage of drinkers	40.2	45.6	49.7	52.9	52.9
Average quantity[a] (*SD*)	2.2 (2 | 1.5)	2.3 (2 | 1.5)	2.5 (2 | 1.7)	2.7 (2 | 1.8)	3.0 (2 | 2.2)
Women					
Percentage of drinkers	21.5	29.4	36.2	39.2	42.8
Average quantity[a] (*SD*)	1.7 (1 | 1.1)	1.6 (1 | 1.1)	1.8 (1 | 1.2)	1.9 (2 | 1.2)	2.1 (2 | 1.3)

Note. In brackets (Median | *SD*).
[a] Number of drinks per hour in completed questionnaires.

Table 2
Results of Latent Growth Curve Model

Group descriptives	Intercept: Number of alcoholic drinks in the first drinking hour	*p*	Slope: Increase/decrease in drinking pace across all hours	*p*
Started 9–10 pm (vs 8–9 pm)	−.281 (.075)	<.001	.069 (.044)	.120
Started 10–11 pm (vs 8–9 pm)	−.117 (.088)	.187	.081 (.064)	.211
Gender[1]	.570 (.096)	<.001	.122 (.048)	.011

Note. Figures shown are unstandardized regression coefficients (standard errors in parentheses). Model fit: CFI = .905; TLI = .872; RMSEA = .071; $SRMR_{(within)}$ = .046; $SRMR_{(between)}$ = .028.
[1] Gender was entered using two labels: 0 = females, 1 = males.

specific drinking patterns. Furthermore, a possible line of research could be combining EMA data across the evening with transdermal alcohol monitors to compare and validate the reported results with biometric data.

When interpreting the results, several limitations should be considered. First, the participant sample consisted of students who were only included if they consumed alcohol on a regular basis. This nonrandom sampling method may decrease the generalization of the findings, as they may not apply to light or infrequent nonstudent drinkers. Nevertheless, this group is known to be a vulnerable group for heavy drinking (Quigley & Marlatt, 1996), making the current results relevant in terms of risky drinking. Second, in the current design, the number of hours measured was limited in order to improve response rates and the quality of the dataset. Therefore, no hourly data were gathered before 8 p.m., even though it is entirely possible that individuals began drinking earlier. Third, alcohol intoxication may have influenced the participants' compliance and data quality by causing a decrease in response rates later in the evening, as intoxicated individuals may have stopped reporting their alcohol use. Nonetheless, if this was the case, it would have most likely resulted in an underestimation of the quantity of alcohol consumed. Fourth, no instruction was given to the participants about the standard glass size, which could have produced individual differences. However, it is unlikely that the time of drinking onset was related to glass sized. In contrast, the strength of the current study is the use of event-level assessments with a total of 11,140 assessments over 2,781 evenings. This sophisticated design, with very short recall periods (the previous 60 min), allowed us to collect detailed information on drinking patterns over the evening (Kuntsche & Labhart, 2013b, 2013c).

Conclusion

The current study shows that no catching-up drinking patterns were found when individuals started drinking later in the evening. Motivating people to postpone the first drink in the evening could help individuals to reduce drinking on weekend nights. We would like to encourage researchers to use ecological momentary assessment techniques for the replication of findings on evening-level drinking patterns, especially in other countries and its association with evening- or individual-specific factors.

References

Cullum, J., O'Grady, M., Armeli, S., & Tennen, H. (2012). The role of context-specific norms and group size in alcohol consumption and compliance drinking during natural drinking events. *Basic and Applied Social Psychology, 34,* 304–312. http://dx.doi.org/10.1080/01973533.2012.693341

Foster, J. H., & Ferguson, C. (2014). Alcohol 'pre-loading': A review of the literature. *Alcohol and Alcoholism, 49,* 213–226. http://dx.doi.org/10.1093/alcalc/agt135

Graham, K., & Wells, S. (2003). 'Somebody is gonna get their head kicked tonight!' Aggression among young males in bars—A question of values? *British Journal of Criminology, 43,* 546–566. http://dx.doi.org/10.1093/bjc/43.3.546

Groefsema, M., Engels, R., Kuntsche, E., Smit, K., & Luijten, M. (2016). Cognitive biases for social alcohol-related pictures and alcohol use in specific social settings: An event-level study. *Alcoholism: Clinical and Experimental Research, 40,* 2001–2010. http://dx.doi.org/10.1111/acer.13165

Harford, T. C., Wechsler, H., & Muthén, B. O. (2003). Alcohol-related aggression and drinking at off-campus parties and bars: A national study of current drinkers in college. *Journal of Studies on Alcohol, 64,* 704–711. http://dx.doi.org/10.15288/jsa.2003.64.704

Higgs, S., Stafford, L. D., Attwood, A. S., Walker, S. C., & Terry, P. (2008). Cues that signal the alcohol content of a beverage and their effectiveness at altering drinking rates in young social drinkers. *Alcohol and Alcoholism, 43,* 630–635. http://dx.doi.org/10.1093/alcalc/agn053

Hoeppner, B. B., Barnett, N. P., Jackson, K. M., Colby, S. M., Kahler, C. W., Monti, P. M., . . . Fingeret, A. (2012). Daily college student drinking patterns across the first year of college. *Journal of Studies on Alcohol and Drugs, 73,* 613–624. http://dx.doi.org/10.15288/jsad.2012.73.613

Kline, R. B. (2005). *Principles and practice of structural equation modeling*. New York, NY: Guilford Press.

Kuntsche, E., Kuntsche, S., Thrul, J., & Gmel, G. (2017). Binge drinking: Health impact, prevalence, correlates and interventions. *Psychology & Health, 32,* 976–1017. http://dx.doi.org/10.1080/08870446.2017.1325889

Kuntsche, E., & Labhart, F. (2012). Investigating the drinking patterns of young people over the course of the evening at weekends. *Drug and Alcohol Dependence, 124,* 319–324. http://dx.doi.org/10.1016/j.drugalcdep.2012.02.001

Kuntsche, E., & Labhart, F. (2013a). Drinking motives moderate the impact of pre-drinking on heavy drinking on a given evening and related adverse consequences—An event-level study. *Addiction, 108,* 1747–1755. http://dx.doi.org/10.1111/add.12253

Kuntsche, E., & Labhart, F. (2013b). ICAT: Development of an Internet-based data collection method for ecological momentary assessments using personal cell phones. *European Journal of Psychological Assessment, 29,* 140–148. http://dx.doi.org/10.1027/1015-5759/a000137

Kuntsche, E., & Labhart, F. (2013c). Using personal cell phones for ecological momentary assessment. *European Psychologist, 18,* 3–11. http://dx.doi.org/10.1027/1016-9040/a000127

Kuntsche, E., Otten, R., & Labhart, F. (2015). Identifying risky drinking patterns over the course of Saturday evenings: An event-level study. *Psychology of Addictive Behaviors, 29,* 744–752. http://dx.doi.org/10.1037/adb0000057

Labhart, F., Ferris, J., Winstock, A., & Kuntsche, E. (2017). The country-level effects of drinking, heavy drinking and drink prices on predrinking: An international comparison of 25 countries. *Drug and Alcohol Review, 36,* 742–750. http://dx.doi.org/10.1111/dar.12525

Labhart, F., Graham, K., Wells, S., & Kuntsche, E. (2013). Drinking before going to licensed premises: An event-level analysis of predrinking, alcohol consumption, and adverse outcomes. *Alcoholism: Clinical and Experimental Research, 37,* 284–291. http://dx.doi.org/10.1111/j.1530-0277.2012.01872.x

Labhart, F., Wells, S., Graham, K., & Kuntsche, E. (2014). Do individual and situational factors explain the link between predrinking and heavier alcohol consumption? An event-level study of types of beverage consumed and social context. *Alcohol and Alcoholism, 49,* 327–335. http://dx.doi.org/10.1093/alcalc/agu001

Leeman, R. F., Heilig, M., Cunningham, C. L., Stephens, D. N., Duka, T., & O'Malley, S. S. (2010). Ethanol consumption: How should we measure it? Achieving consilience between human and animal phenotypes. *Addiction Biology, 15,* 109–124. http://dx.doi.org/10.1111/j.1369-1600.2009.00192.x

Muthén, L. K., & Muthén B. O. (1998–2012). *Mplus user's guide*. Los Angeles, CA: Author.

Neighbors, C., Lee, C. M., Lewis, M. A., Fossos, N., & Larimer, M. E. (2007). Are social norms the best predictor of outcomes among heavy-drinking college students? *Journal of Studies on Alcohol and Drugs, 68,* 556–565. http://dx.doi.org/10.15288/jsad.2007.68.556

Quigley, L. A., & Marlatt, G. A. (1996). Drinking among young adults: Prevalence, patterns, and consequences. *Alcohol Health & Research World, 20,* 185–191.

Saunders, J. B., Aasland, O. G., Babor, T. F., de la Fuente, J. R., & Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption-II. *Addiction, 88,* 791–804. http://dx.doi.org/10.1111/j.1360-0443.1993.tb02093.x

Smit, K., Groefsema, M., Luijten, M., Engels, R., & Kuntsche, E. (2015). Drinking motives moderate the effect of the social environment on alcohol use: An event-level study among young adults. *Journal of Studies on Alcohol and Drugs, 76,* 971–980. http://dx.doi.org/10.15288/jsad.2015.76.971

Thrul, J., & Kuntsche, E. (2016). Interactions between drinking motives and friends in predicting young adults' alcohol use. *Prevention Science, 17,* 626–635. http://dx.doi.org/10.1007/s11121-016-0660-5

Wechsler, H., Dowdall, G. W., Davenport, A., & Castillo, S. (1995). Correlates of college student binge drinking. *American Journal of Public Health, 85,* 921–926. http://dx.doi.org/10.2105/AJPH.85.7.921

Received January 25, 2018
Revision received September 4, 2018
Accepted September 5, 2018 ■